Claims

[c1]   A control system for a powersplit hybrid electric vehicle (HEV) powertrain
powered by at least one of an engine, a traction motor, and a generator motor,
comprising:

an accelerator position sensor;

a traction motor temperature sensor;

a vehicle speed sensor;

a PRNDL position sensor;

a battery for powering the traction motor and generator motor and receiving
power from the generator motor; and

a vehicle system control (VSC) to control the vehicle powertrain, the VSC

receiving input from the accelerator position sensor, vehicle speed
sensor, traction motor temperature sensor, and PRNDL position sensor,

making a determination of whether zero accelerator demand from the
driver is requested,

making a determination of whether the PRNDL is in a forward drive mode,

making a determination of whether the engine is running,

making a determination of whether the vehicle is rolling backward,

making a determination of whether the traction motor exceeds a
predetermined temperature threshold, and

starting the engine if the engine is off and traction motor temperature
exceeds a predetermined threshold,

starting the engine if the engine is off and the vehicle is rolling backward,

commanding a traction motor torque request when the engine is off,
accelerator demand is zero, the PRNDL is in the forward drive mode, and
the vehicle is not rolling backward based on creep torque or hill holding
function requirements,

commanding the engine to start and providing engine torque when the
engine is off, accelerator demand is zero, the PRNDL is in the forward
drive mode, and the vehicle is rolling backward based on creep torque or
hill holding function requirements, and

commanding an engine torque request when the engine is running,
accelerator demand is zero, and the PRNDL is in the forward drive mode

based on creep torque or hill holding function requirements.

[c2]   The control system of claim 1 further comprises a determination of brake
            position demand based on VSC input from a brake position sensor.

[c3]   The control system of claim 2 wherein commanding the traction motor torque
            request further comprises a zero brake position demand.

[c4]   The control system of claim 2 wherein commanding the engine torque request
            further comprises a zero brake position demand.

[c5]   A method to control a powersplit hybrid electric vehicle (HEV) powertrain
            powered by at least one of an engine, a traction motor, and a generator motor,
            comprising the steps of:
            sensing accelerator position;
            sensing traction motor temperature;
            sensing vehicle speed;
            sensing PRNDL position;
            powering the traction motor and generator motor and receiving power from the
            generator motor with a battery; and
            controlling the vehicle powertrain with a vehicle system control (VSC), the VSC
                receiving input from the accelerator position sensor, vehicle speed
                sensor, traction motor temperature sensor, and PRNDL position sensor,
                making a determination of whether zero accelerator demand from the
                driver is requested,
                making a determination of whether the PRNDL is in a forward drive mode,
            making a determination of whether the engine is running,
                making a determination of whether the vehicle is rolling backward,
                making a determination of whether the traction motor exceeds a
                predetermined temperature threshold, and
                starting the engine if the engine is off and traction motor temperature
                exceeds a predetermined threshold,
                starting the engine if the engine is off and the vehicle is rolling backward,
                commanding a traction motor torque request when the engine is off,
                accelerator demand is zero, the PRNDL is in the forward drive mode, and

the vehicle is not rolling backward based on creep torque or hill holding function requirements,

commanding the engine to start and providing engine torque when the engine is off, accelerator demand is zero, the PRNDL is in the forward drive mode, and the vehicle is rolling backward based on creep torque or hill holding function requirements, and

commanding an engine torque request when the engine is running, accelerator demand is zero, and the PRNDL is in the forward drive mode based on creep torque or hill holding function requirements.

[c6]   The method of claim 5 further comprising the step of making a determination brake position based on VSC input from a brake position sensor.

[c7]   The method of claim 6 wherein commanding the traction motor torque request further comprises a zero brake position.

[c8]   The method of claim 6 wherein commanding the engine torque request further comprises a zero brake position.